ENOVATION CONTROLS

HelmView™
HVS450 & HVS780
Multi-function colour displays

PDM
Power Distribution Module
CAN system input/output

July 2013

MURPHY

EControls

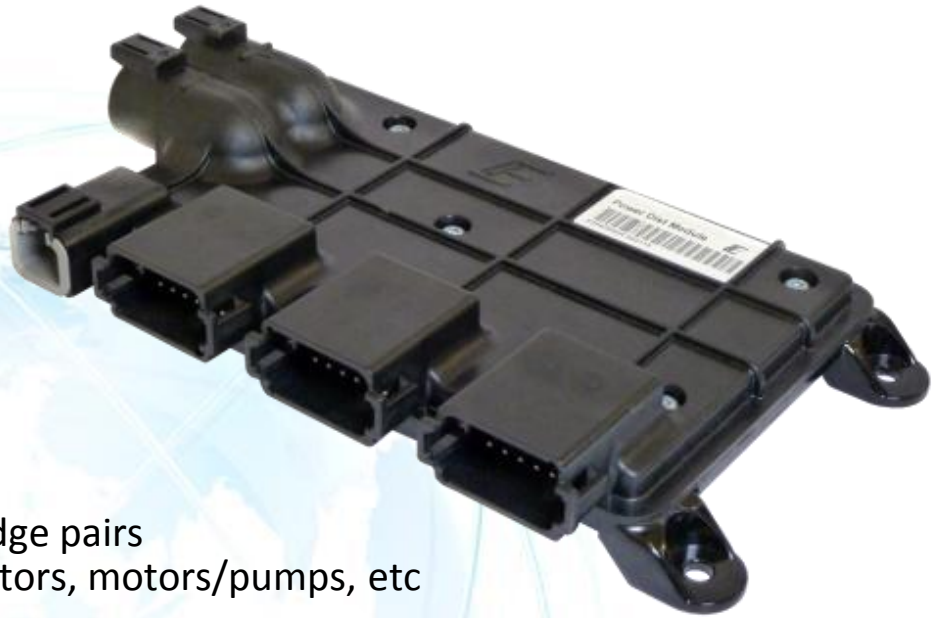
Feature Summary – HelmView™ Displays

- Full colour displays
  - HVS780: 7”/178mm, WVGA 800 x 480 px
  - HVS450: 4.3”/109mm, WQVGA, 480 x 272 px
- Fully sealed, bonded & coated LCD
  - Best-in-class direct sunlight visibility
  - No fogging
  - Day, night & blackout modes
  - Touch control options
- Extensive communication
  - CAN 2.0B: SAE J1939, NMEA2000, CANopen, freeform
  - USB, RS485, PAL/NTSC video
- Class-leading environmental specs
  - IP67, -40 to +85°C, 7.86G_{rms} vibration, 50G shock
- Flexible mounting
  - Front, back and gimble mounting
- PowerVision Configuration Studio™
  - Full OEM customization of graphics & data display, CAN messaging, fault warnings/diagnostics, service reminders

HVS780

HVS450

Feature Summary – PDM



- Power Distribution Module
- CAN-based input/output
  - Inputs: 8 analogue, 12 digital
  - Outputs: 12 digital/PWM
  - Reduced wiring (4 wire CAN + power)
- High power output ratings
  - 15A per output, 70A total
  - Configurable for high-side, PWM or H-bridge pairs
  - Direct control of lighting, solenoids, actuators, motors/pumps, etc
- Totally solid state
  - No moving relay parts
  - Current limited protection without fuses
  - Increased reliability over electromechanical relay/fuse boards and wiring
- Fully encapsulated
  - Environmentally sealed, -40 to +85°C operation, 5-25G/30G vibration/shock
- Fully configurable
  - Flexible, expandable, updateable I/O programming
  - Typically configured and controlled from a HelmView display, using the same PowerVision Configuration Suite tool

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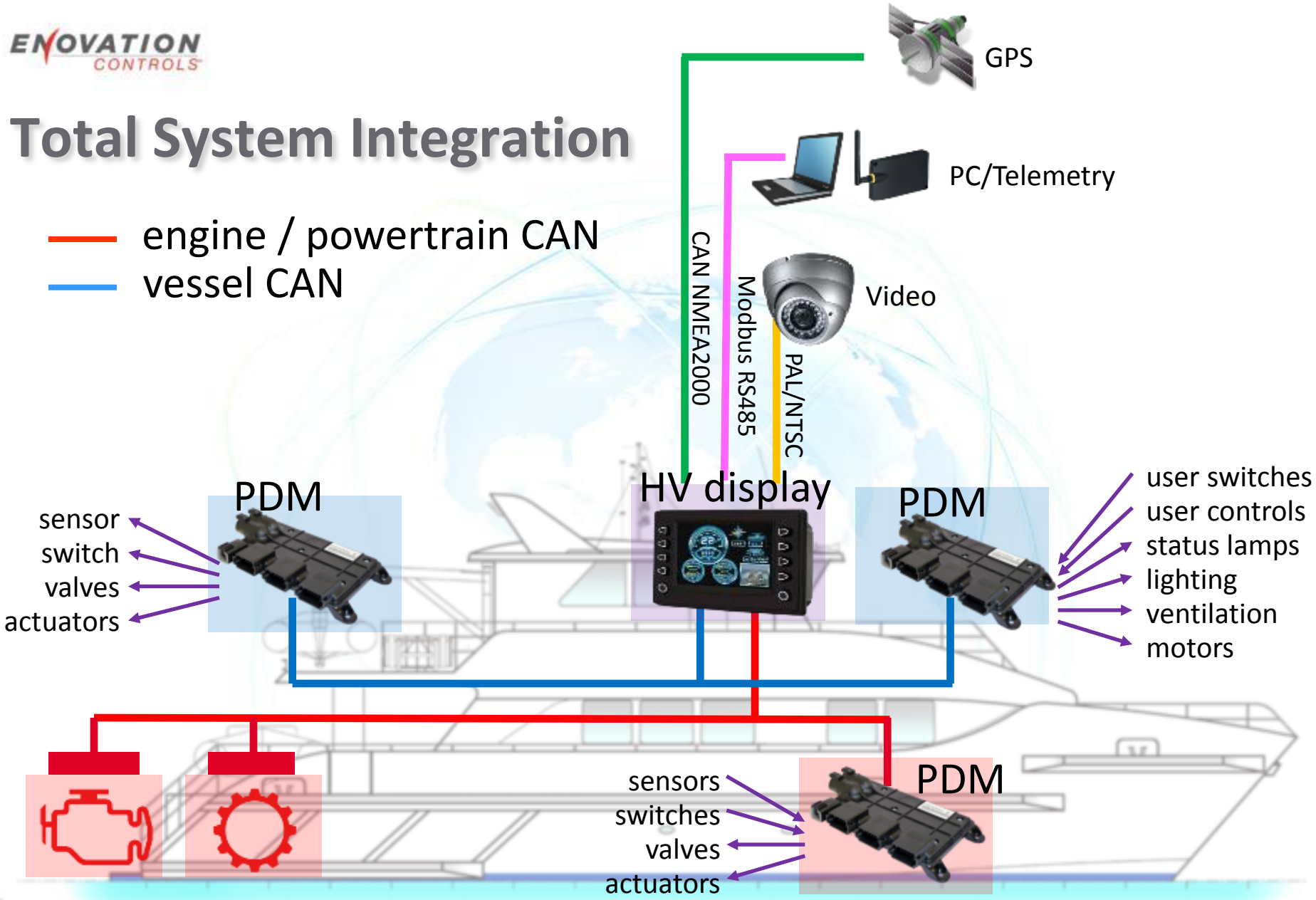
Total System Integration



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HelmView™
HVS450 & HVS780

Multi-function colour displays

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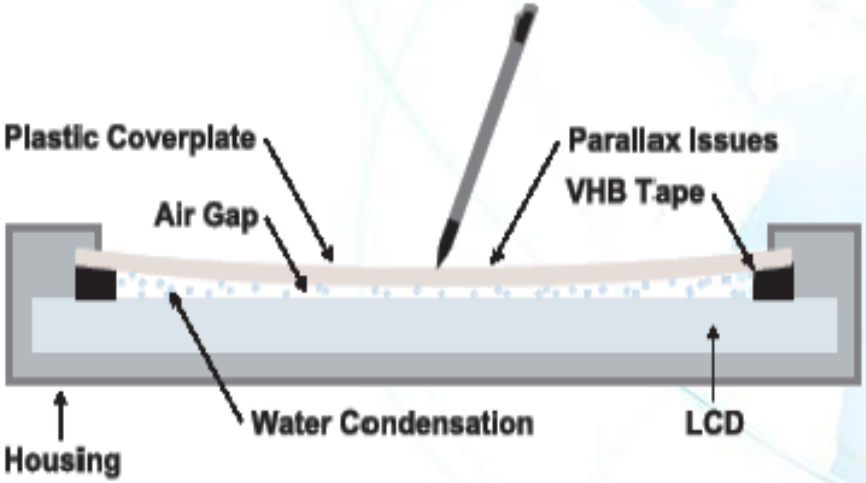
LCD & HMI

	PV450	PV780
Size (diagonal)	4.3 in. / 109 mm	7.0 in. / 178 mm
Resolution, pixels	480 x 272, WQVGA	800 x 480, WVGA
Aspect ratio	16:9	
Colour	16 bit	
Backlight	LED, 500 - 650 cd/m^2, 30000 h life	LED, 1000 cd/m^2, 40000 h life
Viewing angle	horizontal ± 65°, vertical +55°/–65°	
Full bonding	✓	✓
Optical coating	✓	✓
Touch screen	Optional	Optional
Tactile user keys	8, backlit	10, backlit

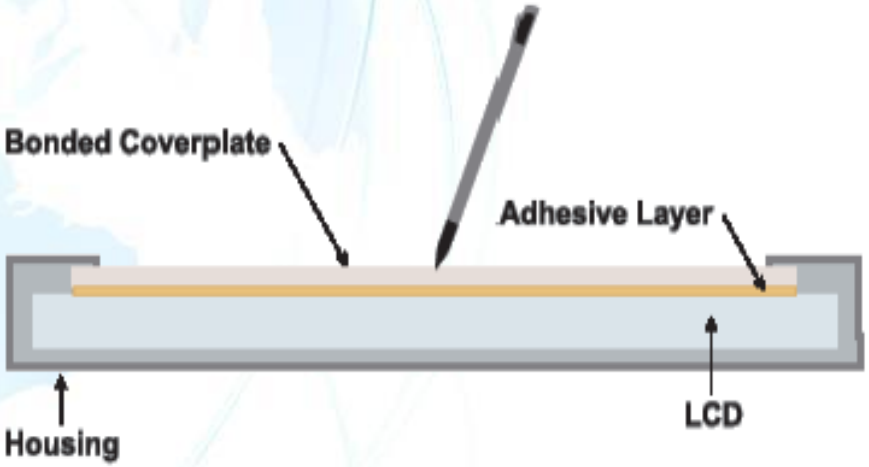
LCD Bonding

- Direct sunlight view-able
  - Optically coupled using adhesive layer

- No fogging
- Very rugged
  - **7.86 g** random vibe!
  - **50 g** shock!



Non-Bonded LCD



Bonded LCD

Processor/Memory

	HVS450	HVS780
Microprocessor	Frescale i.MX357 32 bit, 532 MHz, ARM11 core	Frescale i.MX357 32 bit, 532 MHz, ARM11 core
Operating system	QNX® realtime	QNX® realtime
RAM	128 MB DDR2 SDRAM	128 MB SRAM
Flash	256MB, expandable to 8 GB	2GB total, 1 GB available for data logging
SD card slot		✓
Real time clock, Li-ion backup	✓	✓
Operating voltage	6 – 36 VDC	6 – 36 VDC

Communications, Input, Output

	HVS450	HVS780
Supply voltage	6 – 32 VDC, load dump & reverse polarity protected	6 – 36 VDC, load dump & reverse polarity protected
CAN 2.0B ports	(2), port 2 isolated to NMEA2000	
CAN protocols	SAE J1939, CANopen, NMEA2000, proprietary/freeform	
RS-485 serial	(1) Modbus master/slave	
USB	(1) USB 2.0 host, full speed	
Video	(2, optional) PAL/NTSC, single channel displayed	(3) PAL/NTSC, single channel displayed
Inputs	(1) analog 0-5V, 4-20mA or resistive	(3) analog 0-5V, 4-20mA or resistive (5) digital, active high (1) frequency, 2Hz – 10kHz
Output	(1) digital, low side	(1) digital, low side (1) frequency, 2Hz – 5kHz

Physical, Environmental

	HVS450	HVS780
Electrical connectors	4 x Deutsch DT06	2 x AMPSEAL, 23 pin
Dimensions, w x h x d	186.8 x 96.5 x 49.5 mm	247.7 x 158.2 x 65.5 mm
Temperature, operation	–40 to +85°C	
Temperature, storage	–40 to +85°C	
Protection	IP 66 and 67, front and back	
Electromagnetic compatibility	2004/108/EC (EN61000-6-4, EN61000-6-2, EN 501121-3-2, EN12895) J1113/2, 4, 11, 12, 21, 24, 26, 41	
Vibration	7.86 Grms, 5 – 2000 Hz, 3 axis	
Shock	±50 G, 3-axis	

Physical

	HVS450	HVS780
Electrical connectors	4 x Deutsch DT06	2 x AMPSEAL, 23 pin
Dimensions, w x h x d	186.8 x 96.5 x 49.5 mm	247.7 x 158.2 x 65.5 mm
Protection	IP 66 and 67, front and back	
Electromagnetic compatibility	2004/108/EC (EN61000-6-4, EN61000-6-2, EN 501121-3-2, EN12895) J1113/2, 4, 11, 12, 21, 24, 26, 41 (ISO 11452, 7637 and 10605)	
Vibration	7.86 Grms, 5 – 2000 Hz, 3 axis	
Shock	50 G, 3-axis	
Output	(1) digital, low side	(1) digital, low side (1) frequency, 2Hz – 3kHz

HelmView™ Screen Shots

Stunning, Configurable Graphics

Single Engine View, Day Mode

GPS View, Day Mode

Single Engine View, Day Mode

Single Engine View, Night Mode

Dual Engine Overview, Day Mode

Single Engine View, Night Mode

HelmView™ Displays

Multiple Mounting Options

- In Dash
- Back mount
- Gimbal Mount
- Side-by-side
- In conjunction with other FW Murphy Displays

Port Engine Monitoring

Starboard Engine Monitoring

HelmView™ Displays

Multiple Mounting Options

- In Dash
- Back mount
- Gimbal Mount
- Side-by-side
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Port Engine Monitoring

GPS Screen View

Starboard Engine Monitoring

ENOVATION CONTROLS

PDM
Power Distribution Module

CAN system input/output

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Overview

What is the PDM?

- Control Area Network (CAN) SAE J1939 based I/O module
- Solid state technology: no moving parts
- Replaces relay and fuse-based power distribution
- 12 or 24 VDC supply
- 12 Digital inputs (HS & LS on each input pin allows up to 24 digital in).
- 8 Analogue inputs, 10 bit resolution:
  0 – 5 V standard, other options for high volume.
- 12 High current outputs:
  15 A each, max 70 A simultaneous, H-Bridge on output pairs is possible
- Class-leading environmental protection

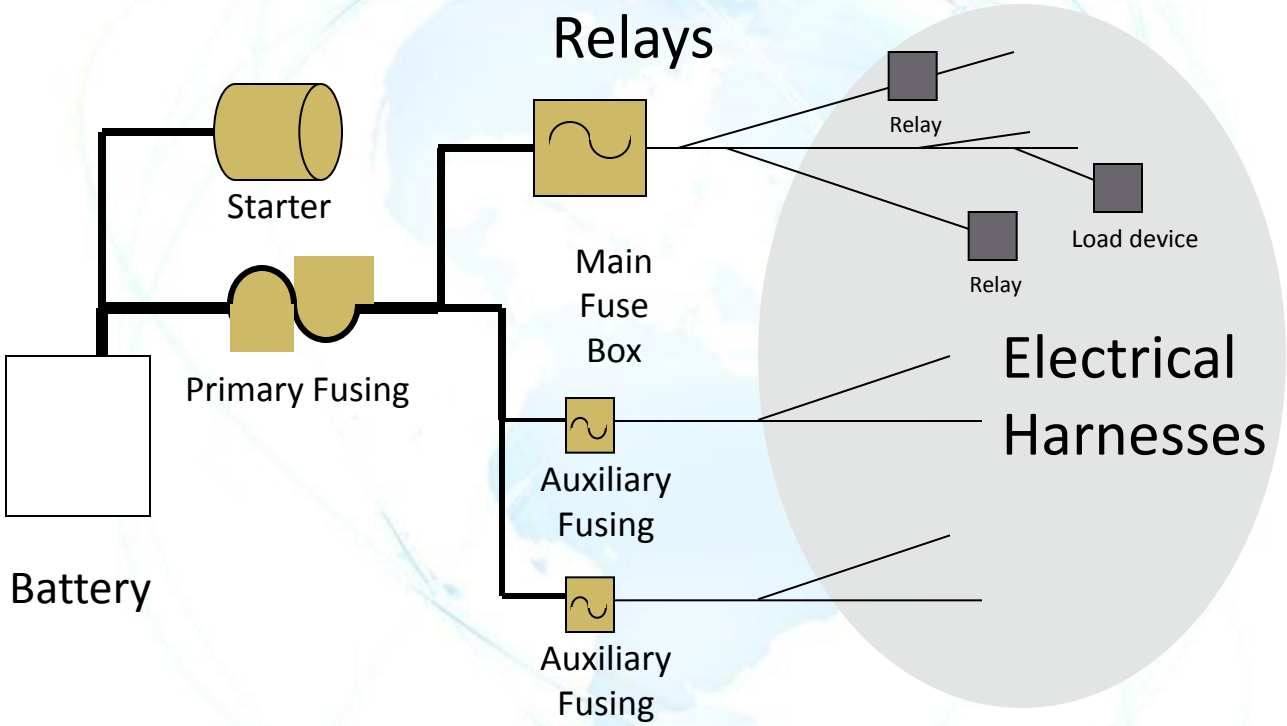
Overview

How is it used?

- PDM is configured via standard SAE J1939 Proprietary A messages
  e.g. using Murphy PowerVision Configuration Suite™
- Outputs are commanded via standard SAE J1939 Proprietary A messages
- Input data used to generate standard SAE J1939 Proprietary A messages (transmit rate is configurable)
- Normally used in conjunction with a controller, display or other device capable of performing logic and sending/receiving CAN messages

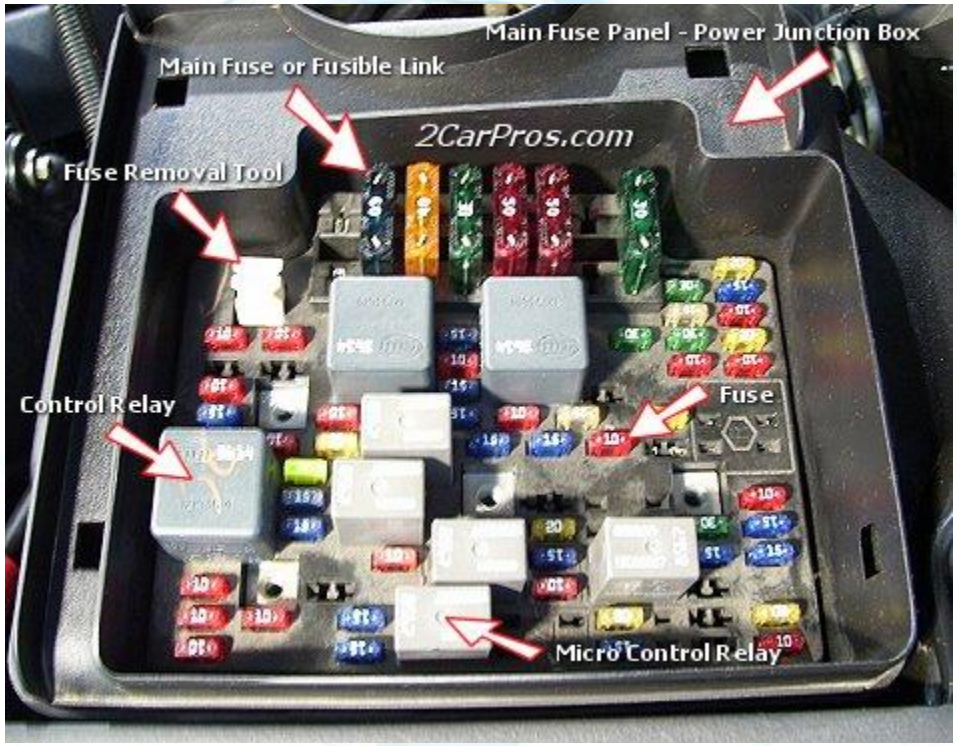
Existing solutions

Traditional Power Distribution



Existing solutions

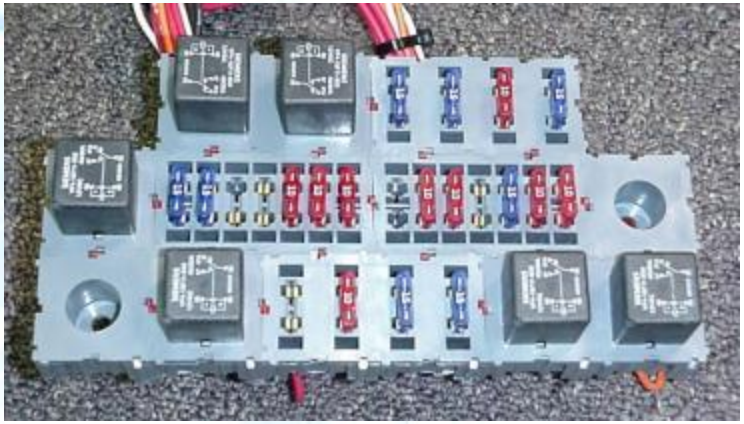
Relay/fusebox derived



Existing solutions

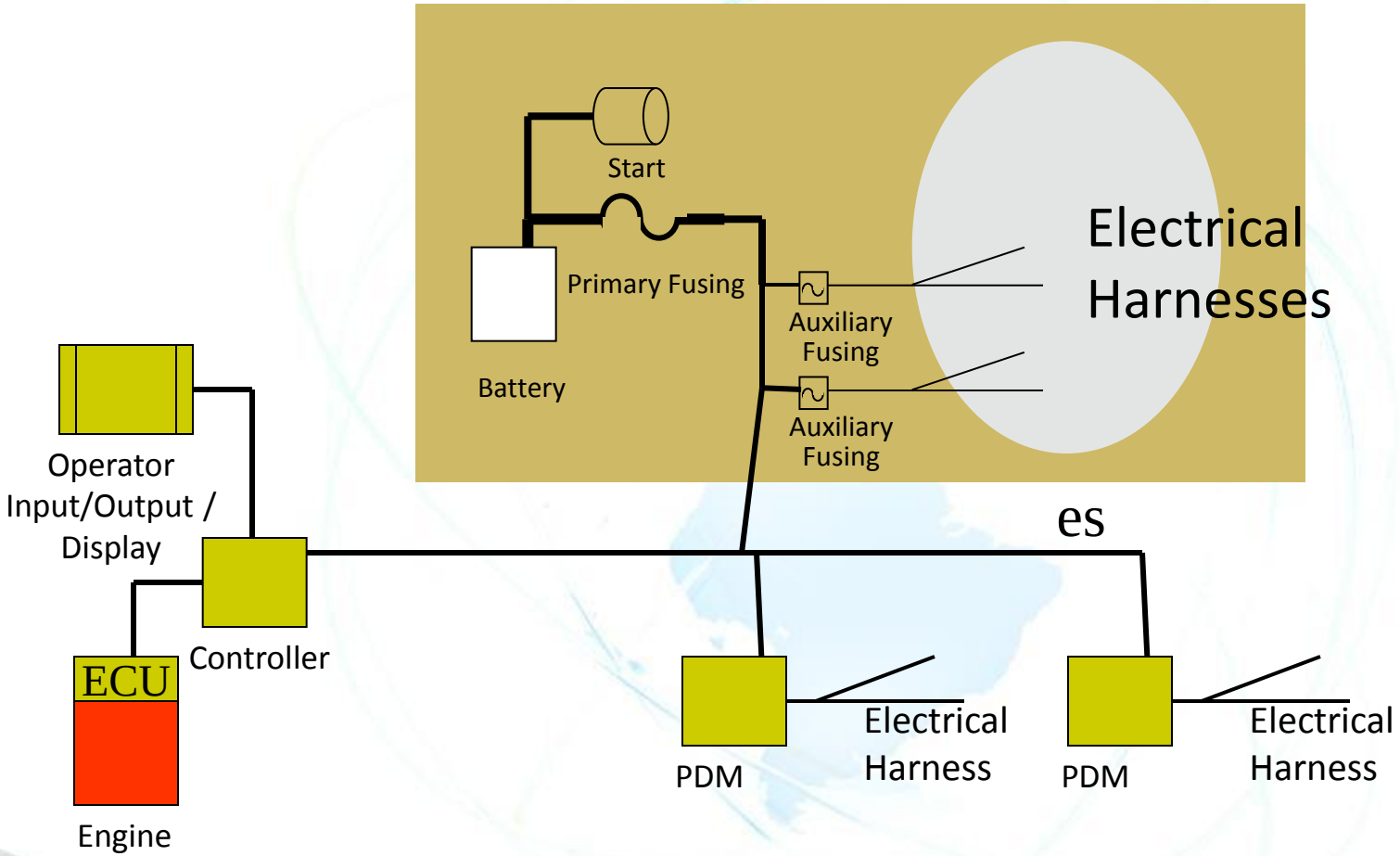
Hard Wired Module Method

- Hand wiring = high labour costs
- Manual assembly increases quality risks and reduces reliability
- Wire bundle may be vibration sensitive and prone to shorts/failures
- Must be packed in an external housing: extra expense and valuable space
- Not flexible, programmable or easily upgraded



Future solutions

CAN & Solid State Power Distribution



Features & Benefits

1. Solid state device:
   no moving parts; eliminates fuses & relays; longer, more reliable operating life
2. Wiring reduction and better integration with other systems:
   simple power & CAN J1939 network (4 wires)
3. Analogue and digital input measurement and CAN conversion
4. High current drive: 15 A each, 70 A total, H-bridge options
5. Proportional output drive (current feedback for outputs)
6. Overcurrent shutdown
7. Diagnostic feedback (short, open, overcurrent, overtemp)
8. Rugged, encapsulated & sealed:
   Fully sealed IP67 enclosure uses standard Deutsch connectors
9. Reduced footprint and flexible mounting (can also simplify harness)
10. Configurable: I/O functions and CAN messaging are programmable,
    allowing flexible upgrade & expansion

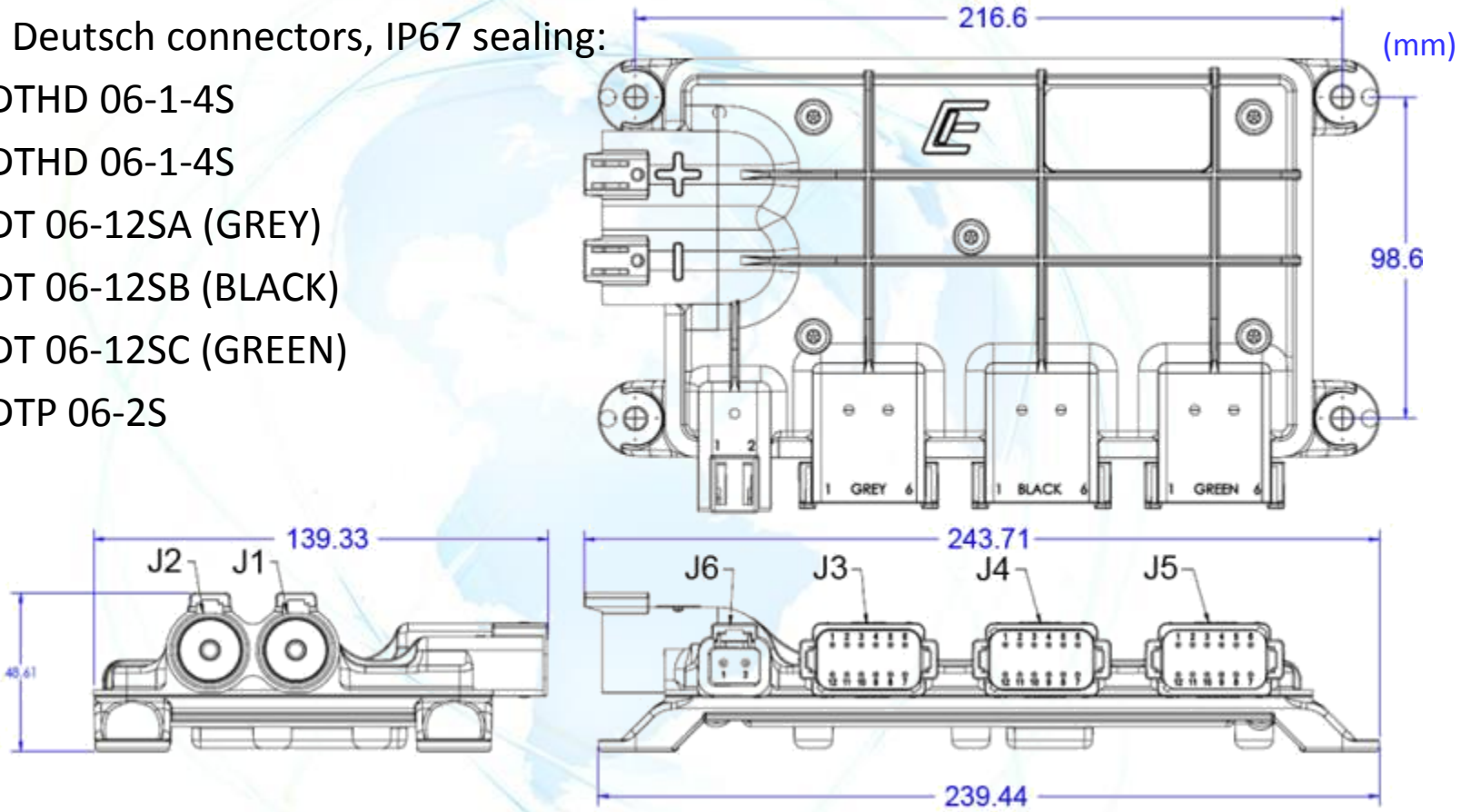
Applications

- Collecting data from input devices:
  pressure, flow, temperature, position, inclination, etc.
- Collecting data from user:
  rocker switch, joystick, keypad, toggle, potentiometer, etc.
- Driving high current loads:
  valves, actuators, motors, lighting
- Replacing /expanding relay and fuse based power distribution
- Generating CAN J1939 message data for control or display purposes
- Heavy duty, severe environments: on/off-highway, marine, industrial

Electrical Connection

Standard Deutsch connectors, IP67 sealing:

J1	DTHD 06-1-4S
J2	DTHD 06-1-4S
J3	DT 06-12SA (GREY)
J4	DT 06-12SB (BLACK)
J5	DT 06-12SC (GREEN)
J6	DTP 06-2S



Electrical Connection

Standard Deutsch connectors, IP67 sealing:

J1	DTHD 06-1-4S
J2	DTHD 06-1-4S
J3	DT 06-12SA (GREY)
J4	DT 06-12SB (BLACK)
J5	DT 06-12SC (GREEN)
J6	DTP 06-2S

J3 – J5 require a W12S wedgelock and size 16 contacts

J6 requires a WP-2S wedgelock and size 12 contacts

Murphy mating connector kit **B6587:**

Specification, Electrical

- DC Supply:
  - 12 or 24 VDC (universal 8 - 32V)
- Inputs:
  - 8 analogue, 0 - 5 VDC standard (
  - 12 digital, tri-state (high side, low side, open)
  - Supply for sensor excitation, 5 VDC/70mA
- Outputs:
  - 12 digital, high current (15A each, 70A total, configurable as high side, PWM or 6 H-bridge pairs)
- CAN:
  - CAN 2.0B active, default protocol SAE J1939, Baud rate 250Kbits

Specification, Physical

- Housing
  - Combination PBT and E-coated aluminium with integrated mounting feet
- Temperature
  - Operating: -40 to +85°C (-40 to +185 F)
  - Storage: -40 to +125°C (-40 to +257 F)
- Environmental Sealing
  - SAE J1455, sections 4.5.3 water intrusion: 1500 psig water @ 50° C, 4 inches away, for 15 minutes with the harness connected.
- Vibration/shock
  - Vibration: 5 to 25G, 50-2000Hz, 72 hours/axis.
  - Shock: 30G, 3 cycles
- Electromagnetic Compatibility
  - Radiated immunity, tri-plate test 100 V/M, 10 KHz - 1 GHz

Summary

- An attractive alternative for adding power distribution to an existing vessel
- Fully potted & sealed construction
- Solid state: no relays or fuses are required; self-resetting overload protection
- CAN SAE J1939 network reduces wiring harness size and complexity
- Vessel power consumption continues to increase –
  High Power capability & PWM too
- Diagnostics

PowerVision Configuration Studio™

- PC-based display development software
- Allows OEM customization of:
  - HelmView HV750/HVS780/HVS450 colour displays
  - PowerView PV450/780 colour displays
  - PV350/380 monochrome displays
  - Marine Engine Room Panel
  - PDM Power Distribution Module
- Full control of:
  - Multi-layer screen graphics: gauges, data, video, pop-ups
  - CAN messaging: J1939, NMEA2000, CANopen, freeform
  - Fault codes & diagnostics
  - Multi-language support
  - Datalogging
- Display configuration via:
  - PC to display wired connection
  - USB memory stick

PowerVision Configuration Studio™

- Latest version V2.6:
  - New widgets
  - Improved state machines and programming enhancements
  - Additional support for PDM Power Distribution Module
  - Easily modify diagnostic messages
  - Many more improvements !
- One licence per company
- Online support community
  - forum.fwmurphy.com
  - 300 users

PowerView displays & PDM

Applications

Applications – Recreational tow/sport

- Supra

- Regal

Applications – Recreational tow/sport

- Boesch

- HCM

Applications – Commercial

- Goodchild

- Mustang

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Questions?

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Thank you

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